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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/276,273	03/25/1999	TYLER LOWREY	2024.17	1882
24963	7590	06/04/2004	EXAMINER	
ENERGY CONVERSION DEVICES, INC.			CAO, PHAT X	
2956 WATERVIEW DRIVE			ART UNIT	
ROCHESTER HILLS, MI 48309			PAPER NUMBER	

2814

DATE MAILED: 06/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/276,273

Applicant(s)

LOWREY ET AL. 

Examiner

Phat X. Cao

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-- The MAILING DATE of this communication appears on the cover sheet with the corresponding address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 March 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 258-275 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 258-275 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

1. The cancellation of claims 1-257 in Paper filed 3/9/04 is acknowledged.

#### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

3. Claims 269-271 and 274-275 are rejected under 35 U.S.C. 102(e) as being anticipated by Gonzalez et al (US. 5,854,102).

Gonzalez discloses a memory element, comprising: a conductive sidewall spacer 38 between a first dielectric material and a second dielectric material 20 (Fig. 6); and a programmable resistance material 46 of chalcogen (column 8, lines 32-40) in electrical communication with the conductive sidewall spacer 38 by coupling to a top surface of the conductive sidewall spacer 38 (Fig. 8); wherein the first and second dielectric material 20 made of silicon dioxide material (column 6, lines 42-46).

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4. Claims 269-275 are rejected under 35 U.S.C. 102(e) as being anticipated by Ovshinsky (US. 5,687,112).

Regarding claims 269-271 and 274-275, Ovshinsky (Fig. 2) discloses a memory element, comprising: a conductive sidewall spacer 34 between a first dielectric material and a second dielectric material 18; and a programmable resistance material 36 of chalcogen (column 15, lines 64-67) in electrical communication with the conductive sidewall spacer 34 by coupling to a top surface of the conductive sidewall spacer 34.

Regarding claims 272-273, Ovshinsky's Fig. 2 further discloses that the conductive sidewall spacer 34 includes a protruding portion 16 extending toward the programmable resistance material 36, and the top surface of conductive sidewall spacer 34 can be a conical, pyramidal, elongated or wedge-shaped frustums (column 14, lines 58-60).

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 269-275 are rejected under 35 U.S.C. 102(b) as being anticipated by Ovshinsky et al (US. 5,414,271).

Ovshinsky (Fig. 1) discloses a memory element, comprising: a conductive sidewall spacer 32 between a first dielectric and a second dielectric 20 of the same material; and a programmable resistance material 36 of chalcogen (column 16, lines 52-54) in electrical communication with the conductive sidewall spacer 32 by electrically

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coupling to a top surface of the conductive sidewall spacer 32; wherein the conductive sidewall spacer 32 includes a protruding portion extending toward the programmable resistance material 36.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 258-268 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gonzalez et al (US. 5,854,102) in view of Tanahashi (US. 6,064,084).

Regarding claims 258-259, 261-266 and 268, Gonzalez (Fig. 30) discloses a memory element, comprising: a dielectric material having an opening; a conductive material 162 of tungsten lining the sidewall surface of the opening; and a programmable resistance material 164 of chalcogen (column 15, lines 45-46 and column 8, lines 34-37) coupled to a top surface of the conductive material 162.

Gonzalez does not disclose that the conductive material 162 is a cup-shape having a second dielectric material formed within the opening of the cup-shape.

However, Tanahashi (Fig. 3C) teaches the forming of the conductive material 53 being a sup-shape, having a raised portion extending to an end, and having a second dielectric layer 54 formed within the opening of the cup-shape. Accordingly, it would have been obvious to modify the device structure of Gonzalez by forming the conductive material 162 with the structure as set forth above, because according to

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Tanahashi, such structure would reduce the contact resistance of the conductive material (column 3, lines 62-64).

Regarding claims 260-267, Tanahashi's Fig. 3C further discloses the conductive sidewall spacer 53 including a protruding portion extending toward the contact line 55, and lining the sidewall surface of the opening 52A over only a portion of the bottom surface of the opening.

### ***Response to Arguments***

9. Applicant argues that none of the applied references teach "a second dielectric material formed over the conductive material within the opening" as claimed in the new claim 258. However, the new reference issued to Tanahashi is applied in the new ground of rejection to show the obviousness of forming the conductive plug structure as claimed.

Applicant further argues that the conductive material 38 shown in Fig. 6 of Gonzalez is not a conductive sidewall spacer and is structurally different from a conductive sidewall spacer as claimed.

This argument is not persuasive because as defined by Applicant's Fig. 1, the conductive sidewall spacer 130A is a conductive material formed within an opening of a dielectric and spaced from the other conductive material 130B. Therefore, there is no difference from the conductive material 130A and the conductive material 38 of Gonzalez because the conductive material 38 is also formed within an opening of a dielectric 20 and spaced from the other conductive material 38 (see Fig. 6).

Applicant also argues that the conductive layer 34 of Ovshinsky '112 (Fig. 2) and the conductive layer 32 of Ovshinsky '271 (Fig. 1) are not conductive sidewall spacers as claimed.

This argument is not persuasive. As is well known in the semiconductor arts, these conductive layers are defined as "conductive sidewall spacer" because they are formed along a sidewall surface of the opening. For example, the U.S. Patent No. 6,258,707 issued to Uzoh is cited to illustrate the use of term "conductive sidewall spacer". Specifically, Uzoh (Fig. 9) discloses a conductive sidewall spacer 124 (column 8, lines 62-67), which is defined as a conductive layer formed along a sidewall surface of the opening.

### ***Conclusion***

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phat X. Cao whose telephone number is (571) 272-1703. The examiner can normally be reached on Monday - Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PC  
June 1, 2004

  
PHAT X. CAO  
PRIMARY EXAMINER